ABSTRACTS (MASTER THESIS)

Molecular analysis of a transporter protein ALMT in *Lotus japonicus*

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Root nodule formed with root cells of legume plant and rhizobia is a nitrogen-fixation apparatus, in which carbon and nitrogen compounds are exchanged between two organisms as symbiosis. For the establishment of nodules, it is important that flavonoids are released from roots as signal molecules, and Nod factors are produced in response by rhizobium, which are then received by the host plant. However, a large portion of the mechanisms are still unknown how metabolites are transport between plant cells and bacteroids and which transporters are involved.

In this study, we focus on a transporter family, Aluminum-activated malate transporter(ALMT) in a model legume, *Lotus japonicus*. ALMT was first identified in wheat as being a malate transporter that mediated Al-dependent efflux of malate chelates from the roots and detoxified Al cation in the rhizosphere.[1)] More recently, it has been turned out that ALMTs are widely distributed in the plant kingdom. Adding to the Al-activated malate transporter conferring Al tolerance to plant cells, an Arabidopsis member AtALMT12 expressed in guard cell is involved in the stomatal movement by regulating the malate transport.[2)] During symbiotic nitrogen fixation, organic acid and ammonia are exchanged between the root cells of legumes and the bacteroids, which mostly use the malate as a carbon source to manage the carbon metabolism. This suggests that malate plays a pivotal role in the symbiotic nitrogen fixation, and thus it has been thought that there should be a malate transporter in the nodules. We have then analyzed ALMTs in *L. japonicus*, whether this transporter is involved in the establishment and function of nodules.

1) Sasaki, et al., (2004) Plant J., 37: 645 - 653.

2) Sasaki, et al., (2010) Plant Cell Physiol. 51: 354 - 365.